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ABSTRACT

To determine the effects of various quantities of teacher instruction (with behavior problem children) following correct and incorrect answers, two elementary school children in a special education classroom were studied. Four teaching conditions were studied for percentage of errors: giving much instruction following incorrect answers and little instruction following correct answers, giving little instruction following incorrect answers and much instruction following correct answers, giving little instruction following both correct and incorrect answers, and giving much instruction following correct and incorrect answers. The only teaching condition which resulted in a decrease in errors was number two. It was concluded that the results suggested that the traditional approach of extra help when the child is not doing well may, in certain cases, retard academic achievement. (Author/CD)

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by

J. Eric Hayes and Robert P. Hawkins

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Kalamazoo Valley Intermediate School District
and
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Kalamazoo, Michigan

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AN ANALYSIS OF INSTRUCTION DURATION AS A CONSEQUENCE FOR CORRECT AND INCORRECT ANSWERS[1]

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Kalamazoo Valley Intermediate School District
and
Western Michigan University

ABSTRACT

The effects of various quantities of teacher instruction following correct and incorrect answers were studied with two elementary school children in a special education classroom. Four teaching conditions were studied. The only teaching condition which resulted in a decrease in errors involved much instruction following correct answers and little instruction time following incorrect answers. The other three conditions, all of which produced high percents of errors, were: (1) giving much instruction following incorrect answers and little instruction following correct answers, (2) giving little instruction following both correct and incorrect answers, and (3) giving much instruction following correct and incorrect answers. These results suggest that the traditional approach of "giving extra help" when a child is not doing well may, in certain cases, retard rather than improve academic achievement.

A brief replication supported the main findings of this study.

[1]The authors would like to express their appreciation to Doris Mosier, Joseph Vaal, and Larry Lindeman for their patience and cooperation during this research.

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INTRODUCTION

In the past much research has been done investigating teacher attention as a consequence for classroom behaviors. Allen, Hart, Buell, Harris, and Wolf (1964) demonstrated that adult attention following isolate behavior would increase the isolate behavior even though the nature of the attention was an attempt to get the isolate child to interact with others. When the adults withheld their attention following isolate behaviors and gave their attention following cooperative play behaviors, the isolate behaviors decreased. Hall, Lund, and Jackson (1968) found that when teacher attention followed study behavior, and non-study behaviors were ignored the amount of time spent studying increased while non-study behaviors decreased. Rather than reprimanding a child when he did not study, the teacher achieved these changes by praising the child for studying. In a particularly significant study, Madsen, Becker, Thomas, Koser and Plager (1968) in an analysis of "Sitdown Commands" given by a teacher, demonstrated that teachers can actually increase the frequency of inappropriate behaviors in the classroom (students standing up) by commanding that an incompatible behavior be emitted (asking students to sit down). Finally Thomas, Becker, and Armstrong (1968) showed that disruptive classroom behavior could be produced and eliminated by systematically varying the nature and timing of a teacher's attention. It was concluded that "showing approval for appropriate behaviors is probably the key to effective classroom management (p.139)."

In all of the above studies, one common error had been made by the teachers described in the different situations, namely that their well-meaning attention was given contingent upon the inappropriate behaviors. In other words, by attempting to help a child interact with other children, stop crying, begin studying, stop getting out of seat inappropriately, and stop being disruptive, the teacher was actually reinforcing and therefore maintaining the undesirable behaviors she wished to eliminate. Clearly, attempting to help a child stop inappropriate behavior by giving some form of attention contingent upon that behavior is a frequent teaching mistake. It might be possible to analyze a teaching situation with correct and incorrect answers being emitted by the student from a similar point of view. Casual observation of teacher behavior frequently discloses a possible mistake being made when a teacher responds to incorrect answers. Often a teacher will follow a correct answer by simply indicating it is correct, while the amount of time spent interacting with the child following an error is much greater. Teachers attempt to help a student who is having difficulty with a subject (i.e., emitting many errors) by giving the student extra explanation, asking further questions, giving hints, or simply waiting for another answer. Of course the teacher's purpose in talking with the child making errors seems logical; she is typically correcting the child's misunderstandings so that further errors will hopefully be less likely. However, if spending more time instructing a student who is making many errors can be viewed as giving greater teacher attention contingent upon student mistakes, then it is apparent that a teacher

might condition and maintain many errors with pupils she is specifically trying to help. This use of teacher attention might be particularly detrimental if the student had received much teacher attention for making errors in the past. Although it is often assumed that giving a child extra help in a subject with which he is having difficulty with should improve his learning (enable him to emit fewer errors), there may be exceptions. That all educators are not aware of the behavioral effects of many common teaching practices is evidenced by the above sample of research literature. The present study was conducted to examine the effects of giving certain kinds of help to a child who is emitting many errors.

EXPERIMENT I

Method

Subject, Setting, and Problem

A thirteen year old girl in a special education classroom for the emotionally disturbed (Hawkins, McArthur, Rinaldi, Gray, and Schaftenaar, 1967) served as the subject. This girl had a history of emitting bizarre behaviors which were usually followed by social attention of adults. These bizarre behaviors have included seizures, inappropriate smiling, pulling down her pants in public, complaining about the effects of her seizures, and telling untrue stories. More general descriptions of her problem include: a synthetic dysfunction of the brain, and emotional problems in regard to her self esteem, her self pride, and her attempts to handle fear, anxiety, and anger about authority figures.

Reading recitation typically involved the teachers or the aides asking questions of an individual student after the student had finished silently reading a story. The other nine students in the class were working individually on their own various projects, so the recitation was highly individualized. The recitation period lasted only five or ten minutes each day and usually consisted of approximately fifteen questions.

The subject, who read at the fourth grade level, was observed to be emitting more errors during some of her individual reading recitation than she had ever been observed to emit in the past. The only new factor accompanying the subject's increased number of errors during reading recitation, appeared to be the addition of a new male teacher's aide to the room. The aide was occasionally helping the teacher by conducting some of the reading recitation periods himself. Observation of these periods disclosed the fact that the aide was spending a great deal of time helping the subject when she gave incorrect answers. The aide responded in a very interested, concerned, and pleasant manner throughout the recitation. He expressed to the experimenter a concern for the subject's lack of progress and indicated that he had been giving her extra help on those points she was having difficulty with. He also reported that some of the answers were not only incorrect, but were so completely unrelated to the questions that he wondered if she had understood the story at all. Prior to the subject's increased number of errors she had been reading stories of equal difficulty and similar format and had demonstrated a satisfactory level of comprehension. The only apparent variable

which had changed was the addition of the new aide to the teaching situation. It was hypothesized that the aide's particular pattern of teaching -- specifically the greater duration of attention following errors than following correct responses -- was responsible for the increased percentage of errors in recitation.

Procedure

The experiment was designed so that several methods of attempting to help the subject during her reading recitation could be analyzed. This design involved a study of four different modes or patterns of teacher behavior (Teaching Conditions). Also a comparison between teacher and aide seemed necessary to determine if variables other than the methods of attempting to help the subject might account for some of the results. For example, the fact that the new aide was a tall, good-looking young man might be relevant. It also seemed possible that in addition to the sex and age differences between the teacher and aide, the novelty of having a new instructor, the aide, might be an important factor. The comparison of the results, obtained by the teacher and the aide was made possible by having them alternate as instructors. Both instructors employed the same teaching methods while in a particular experimental phase. When a change in method was introduced both instructors changed their procedures simultaneously.

The first teaching condition consisted of the instructors' spending a great deal of time attempting to help the subject when she made an error. "Attempting to help" took the form of rephrasing the question, or giving other cues such as relating relevant points of the

story. In responding to an error, the instructor was to avoid either a solicitous tone of voice, which might well have a reinforcing effect in itself, or condescending or critical tones of voice, which might have a punishing effect. The instructors' responses to correct answers were brief, on the other hand, and were allowed to be moderately approving, because this would be the normal behavior of a teacher. Also it might reasonably be expected that if durations of instructor responses to errors and correct answers were equal, the giving of correct answers would tend to be strengthened and maintained. When an answer was correct, the instructor was to indicate to the subject that the answer was correct (in a moderately approving tone) and to occasionally restate or briefly discuss the answer.[1]

The second teaching condition involved the instructors' reversing the conditions of Phase I. The instructors now spent much discussion time following correct answers and very little discussion time following incorrect answers. The same instructions regarding the instructors' tone of voice were still in effect and continued throughout the entire experiment. Only the duration of time was changed. Following an incorrect answer the instructors would state that it was wrong and sometimes briefly explain why. Following each correct answer the instructors would respond in a similar manner to Teaching Condition 1, but with greater duration.

The third teaching condition consisted of having the instructors

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[1] See Appendix A for samples of questions, answers, and teacher comments following the answers.

spend a great deal of time discussing both correct and incorrect answers. No relative difference existed between these two durations.

Finally, the fourth teaching condition involved the instructors' spending only a very small amount of time responding to both correct and incorrect answers. This condition is similar to the third teaching condition in that both correct and incorrect responses received the same duration of "instruction". The difference was that very little time was spent for either correct or incorrect answers.

The daily experimental sessions were conducted as soon as the subject indicated that she had completed the assigned story. The instructors would ask questions which they had previously made up. These questions were designed to cover the important points of the story and were objective in nature. The instructors were asked to keep the level of difficulty of the questions as constant as possible so that a difference in the level of difficulty would not account for any major fluctuations in the percent of error. If the subject was observed to have reread parts or all of the story, this was noted so that this factor could be considered when analyzing fluctuations in the percent of error.

The instructor asking the questions also recorded the data. This involved entering the number of seconds spent talking about either correct or incorrect answers on a piece of paper. The paper was attached to a clipboard and the clipboard was held in a manner so that the subject could not see what was being written. Mounted at the top of the clipboard was a stop watch which the instructor started when he began talking about the answer just given and stopped when he

finished. Also, each successive time was recorded one space down from the previous one so that inspection of the raw data sheet would reveal not only whether the answer was correct or incorrect and how much time was spent responding to each answer, but also in what order the correct and incorrect answers occurred.[2]

The dependent measure, the percent of errors, was computed daily by dividing the total number of errors by the total number of questions asked. The average duration of instructor responses to correct and incorrect answers, the independent variables, were computed by dividing the total number of seconds spent following correct answers by the total number of correct answers, and the total number of seconds spent following incorrect answers by the total number of incorrect answers.

To insure that the experimental procedures were being followed, the experimenter frequently observed sessions and, on several occasions, made tape recordings of sessions for more thorough examination later. Reliability checks were conducted periodically during the experiment to measure the objectivity and accuracy of the instructors' data recording. These checks were accomplished by having a second observer independently record data in the same manner as the instructor. A comparison was made between the data obtained by these two observers on the percent of incorrect answers, the average instruction time spent by the instructors following incorrect answers, and the average instruction time spent by the instructors following

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[2]See Appendix B for a sample raw data sheet.

correct answers. The reliability was computed for each measure separately by dividing the smaller number by the larger number (one figure being the observer's computation of one of the three measures and the other figure being the instructor's computation of that same measure). The resulting ratio, multiplied by 100 to yield "percent agreement" was taken as a measure of reliability for that particular datum.

The experiment was begun with Teaching Condition 1. This condition was continued until an adequate assessment of its behavioral effect was obtained. This took 41 sessions. Teaching Condition 2 was then implemented and continued for 29 sessions. In order to determine whether the change in behavior following introduction of Condition 1 could have been a result of chance factors, the experiment was then repeated. Experimental Phase III involved applying Teaching Condition 1 and Phase IV was a repetition of Teaching Condition 2.

Up to this point in the experiment two manipulations had always been made simultaneously. The duration of instruction following errors and the duration of instruction following correct responses were both manipulated at the same time. The effects obtained in the first four phases might be attributable to either one of those manipulations independent of the other. Therefore, in Experimental Phase V only the instruction time following errors was manipulated. It had been small in Phase IV; and in Phase V it was increased to a value approximately equal to that following correct responses. Thus Experimental Phase V involved instituting Teaching Condition 3, in which the duration of instruction was great following both errors and

correct responses.

Experimental Phase VI consisted of Teaching Condition 4 in which very little instruction time was spent following both correct and incorrect answers. As in Teaching Condition 3, there was no differential instruction time between correct and incorrect answers.

The four Teaching Conditions and their order of presentation, in six Experimental Phases, are summarized in Table 1.

Results and Discussion

During Experimental Phase I (Figure 1) the instruction time following correct answers averaged 5 seconds and the instruction time following incorrect answers averaged 16 seconds. The mean percent of errors during this condition was 55 percent and ranged from a low of 30 percent (on day 12) to a high of 82 percent (on day 1). This percentage seemed close to that which was emitted prior to this experiment. On day 12 the teacher accidentally reversed the time contingencies by spending more average time following correct answers than incorrect. Also on this day the subject reread the story before recitation. These factors in combination or separately may have been responsible for the reduction in percent of errors on this day. During Phase I the subject also reread the story on days 23, 25, 26, 28, and 29. Most of these days' scores are relatively low also, all falling below 50 percent errors. A comparison of the average percent of errors obtained on the days when the teacher asked the questions with the average percent of errors obtained on the days when the aide asked the questions revealed very little difference. It seems clear that

individual differences between teacher and aide such as sex, age, teaching experience, and personality characteristics had little or no effect on the percent of errors. The overall mean percent of errors during Phase I on the days the teacher served as the instructor was 53 percent. The overall mean percent of errors for Phase I on the days the aide served as the instructor was 55 percent.

During the 28 days of Experimental Phase II, when Teaching Condition 2 was in effect, the average amount of time spent by the instructors responding to correct answers was approximately 14 seconds, while instruction time following incorrect answers averaged approximately 4 seconds. Thus, during Teaching Condition 2 much instruction time followed correct answers and little instruction time followed incorrect answers. The percent of errors declined to a mean of 32 during this Teaching Condition. The percent of errors ranged from 53 percent (on day 43) to 12 percent (on day 68). The possibility of individual differences between teacher and aide was analyzed for this Phase also by comparing the percentages of subject errors obtained under each instructor. For the teacher, the Phase II percent of errors averaged 32. For the aide, the percentage averaged 31. As in Phase I, the individual differences between teacher and aide appeared to have little effect on the subject's performance.

Experimental Phase III involved a reinstatement of Teaching Condition 1. The instructors spent approximately 16 seconds responding to incorrect answers and only about 3 seconds responding to correct answers. This resulted in an increase in percent of errors to an average of 51 percent. This change occurred much more rapidly than

the change between the first two Phases, perhaps because the subject had learned to discriminate between the two different Teaching Conditions.

Experimental Phase IV began with a reinstitution of Teaching Condition 2. The instruction time averaged approximately 4 seconds, following errors and 15 seconds following correct answers. Once again this Teaching Condition was accompanied by a decrease in errors. During this Phase, errors diminished to an average of 24 percent. The percent of errors appears to have been approaching the level which was produced by the same Condition toward the end of Phase II. As was noted in Experimental Phase III, a more rapid change was evident in Phase IV than that which resulted when Teaching Condition 2 was first introduced. This again suggests that the subject had learned to make a discrimination between the two Conditions.

Teaching Condition 3 (extensive instruction following both correct and incorrect answers) was employed during Experimental Phase V. For the first time a Teaching Condition was used which involved no relative instruction time difference between correct or incorrect answers. It seemed possible that the error reduction which accompanied Teaching Condition 2 may have been only a function of spending more time discussing correct answers and unrelated to the consequences given for errors. Therefore it would make little difference whether a teacher bothered to spend less time for wrong answers <u>in conjunction with</u> more time for correct answers. During this Condition the instruction time following correct and incorrect answers averaged approximately 15 and 16 seconds respectively. The percent of errors

during Phase V ranged between 18 and 47 percent and averaged 41 percent. This percentage is much greater than that produced by Teaching Condition 2, though not quite as high as that resulting from Teaching Condition 1.

So far it has been suggested that the differential time contingency of Teaching Condition 2 was a necessary factor for reducing errors. The results of Phase V support that conclusion as did the results of Phases I through IV. However it is still possible that the only factor responsible for the reduced percentage of errors of Phases II and IV was the reduced instruction following errors and that the amount of instruction following correct responses was irrelevant. Therefore, Teaching Condition 4 was implemented, in which the instruction following errors was little and yet there was still no time differential between correct and incorrect answers. During Condition 4, instruction time averaged 3 seconds following both correct and incorrect answers. The percent of errors ranged between 43 and 59 percent and averaged 48 percent. As with Teaching Condition 3, this percentage is very high, though not quite as high as was produced by Teaching Condition 1.

It appears that for these experimental conditions, and with this subject, the reduction in percent of errors was accomplished most effectively by employing a differential time contingency with much instruction time following correct answers and little instruction time following incorrect answers. It should be recognized that such differential contingencies may also have been possible through the use of more emphatic praise for correct answers, the use of tangible

reinforcers, or the use of some aversive consequence for errors. The present experiment employed only moderate praise for correct answers and a neutral quality of interaction as a consequence for errors.

The research described in this experiment was an investigation of a possible teaching problem by experimental analysis of several different patterns of teacher behavior during a natural reading recitation period in a public school classroom. Although the advantages of field research like this are great, experimental controls are often more difficult in field settings. The present study was no exception. During the experiment several questions of experimental control arose. For example, even though instructions for teacher behavior were given and the teacher behavior was monitored via audio tapes and direct observations, the results could conceivably have been biased somewhat by the instructors' asking more difficult questions during Teaching Conditions 1, 3, and 4.

A second possible criticism of this study is that cues to the answers for future questions in a recitation period could have been given in the discussion of the answer given to a current question. For example, in Condition 2 the reduction in percent of errors could have been due in part to some additional information about the story which was supplied by the instructor early in the recitation periods that would be of value to the subject in answering questions later in the discussion of that same story. However, if additional information did facilitate a reduction in errors, this effect should have been present during any condition where the instructors spent much instruction time, yet only Teaching Condition 2 resulted in a decrease

in errors.

Still a further possible question about this research is that, the instructors may have been in a position to bias the results somehow because they recorded their own data. For example, an answer which was only partially true could have been interpreted in either direction, depending upon the results that the instructor was currently motivated to achieve. While it is difficult to make any quantitative assessments, the instructors did not appear to bias the results during any of the frequent observations of the experimental sessions.

Finally, while not a question of experimental control, a possible shortcoming of this study was that these results may have been possible only due to the unique individuality of the subject. The possibility exists that these results would not have been obtained if a different subject had been used. Therefore it seemed desirable to replicate the main findings of this experiment under conditions which would circumvent some of the possible shortcomings. A similar experiment was designed which would eliminate the possibility of bias in selection of questions, the possibility of instructor-bias in recording of data, and the possibility of extra information being provided early in the session that could be helpful in answering later questions. In addition, a new subject was selected so that some assessment could be made of the subject specificity or generality of the effects obtained with the first subject.

EXPERIMENT II

Method

Subject and Setting

A ten year old boy was selected from the same class as the first subject. The boy was reading on the second grade level. Because this boy did not emit a high percentage of errors during his reading recitation period, this replication should therefore represent a stringent test of the generality of the main findings from the first experiment. Some of the maladaptive behaviors which had caused this boy to be placed in the School Adjustment Program included temper tantrums, swearing, physical aggression, and requesting more help with certain academic subjects than was deemed necessary by his teacher.

The second experiment was conducted in the same room, with the same class members present as in the first experiment. The general procedures for the reading recitation period were also the same as those described for Experiment I. Unfortunately only a few days remained before the close of the 1969-1970 school year, so the replication was brief and incomplete.

Procedure

Certain changes were made in the second experimental design to implement more adequate experimental controls. To remove the control of the difficulty level of questions from the instructors, a text was selected which contained questions over the stories. Therefore if the difficulty level of the questions did happen to vary, it was

extremely unlikely that they would systematically vary in a manner which would coincide with the experimental manipulations. To reduce the possibility of the instructors' biasing results by giving the subject information during the discussion of a current answer, the teacher was instructed not to discuss any aspect of the story other than those covered by previous questions. Data were no longer recorded by the instructor but by the experimenter or an assistant. An additional change in personnel occurred; the original aide resigned (for personal reasons unrelated to this research) and was replaced by another young man.

A few other changes in procedure were implemented as a result of the limited number of remaining school days. One was that there were two sessions a day so that more data could be obtained. This necessitated splitting the daily reading assignment in half and using one half of the story for each recitation period. The instructors each conducted one session per day, but each had some morning sessions and some afternoon sessions during the study. Time did not allow all four teaching conditions to be investigated.

Experimental Phase I began with the aide utilizing Teaching Condition 4 and the teacher employing Teaching Condition 1. Experimental Phase II consisted of both instructors behaving according to Teaching Condition 2. Because this experiment was cut short by the end of the school year six days were included in Phase I and only three days were included in Phase II.

Results and Discussion

The data were plotted separately for the Teacher (Figure 2) and the aide (Figure 3). During Experimental Phase I the teacher spent an average of 4 seconds of instruction following each correct answer (Figure 2), and an average of approximately 12 seconds of instruction following incorrect answers. The subject's percent of errors under the teacher's instruction averaged 50 percent during the six days of Phase I and ranged from 36 percent on day 3 to 75 percent on day 5. An increasing trend appeared to have been developing during this Phase. On day 2 the teacher accidentally assumed Teaching Condition 4 behaviors. She was confused because the order was switched so that she asked questions during the second session of the day, as the aide had done the previous day. The percent of errors did not fluctuate noticeably on this day.

Teaching Condition 2 was initiated at the beginning of Experimental Phase II. This Condition continued for only 3 days, then school was dismissed for the summer. During these 3 days the teacher spent an average of about 11 seconds of instruction following correct answers and 3 seconds instructing after incorrect answers. The percent of errors averaged 25 percent for the three days. This represents a reduction of about 25 percent from Phase I and supports the main findings of the first experiment.

The aide behaved according to Teaching Condition 4 during Phase I. He averaged approximately 3 seconds of instruction time following both correct and incorrect answers, with the exception of day 5 when he spent 0 seconds following correct answers because there were none

emitted during the session (Figure 3). The percent of errors ranged widely, from 36 on day 2 to 100 on day 5, and averaged 62 during the six days of Phase I.

On the seventh day, Teaching Condition 2 was initiated for the aide's Experimental Phase II so that he was behaving like the teacher. The aide averaged almost 11 seconds responding to correct answers and averaged between 3 and 4 seconds responding to correct answers (ignoring day 7 when there were no incorrect answers given). On the first day of this Phase the percent of errors declined abruptly to 0 percent. This drastic decrease in errors may have been a result of the immediate change in the way the aide was responding. Up until this day, the aide had said very little following correct and incorrect answers. It is not possible to explain why the first answer was correct, but the sudden increase in instruction time following correct answers may have accounted for some of this reduction in errors. Also the subject had emitted fewer errors during the first session than he had to date. Therefore some carryover from doing well earlier in the day may be an additional relevant factor. During the three days of Phase II the percent of errors averaged approximately 28 percent. This represents an average error reduction of 34 percent from Phase I to Phase II. As in Experiment I, Teaching Condition 2 was accompanied by a reduction in errors. Therefore Teaching Condition 2 was the only teaching condition which was accompanied by a reduction in errors. This error reduction occurred, without exception, everytime Condition 2 was initiated in both experiments.

While the results of the second experiment are not as extensive

as those of the first, they do suggest that similar results will occur with subjects other than the girl in the first experiment. Also the second experiment included some controls which were lacking in the first design. These controls did not seem to alter the general results when incorporated into the second design. Therefore the results of the second experiment add support to the conclusions of the first experiment.

General Discussion and Conclusion

These data taken as a whole, point to Teaching Condition 2 as the only one of the four conditions examined which resulted in a decrease in errors. High percents of errors were produced by: (1) differential instruction time when more instruction followed errors and less instruction followed correct answers (Condition 1), and (2) non-differential instruction of either great or little amounts of time (Conditions 3 and 4 respectively). Spending either a great deal or very little instruction time with these children was not sufficient to reduce errors. A reduction in percent of errors was obtained only when more time was spent following correct answers and less time was spent following incorrect answers.

It should be recognized that Teaching Condition 4, a rather common pattern of teaching in which the attention given contingent upon either errors or correct responses is minimal, was applied only after a phase in which the percent of errors was high. It is possible that Condition 4 would simply have maintained any percentage of error existing at the time of its institution. Had there been sufficient time

in the school year, Condition 4 would have been applied again but after a phase in which the percentage of error was low, to determine if it would also maintain that behavior pattern.

These results suggest a need to re-evaluate the practice of giving "extra help" to a child who is having difficulty with a subject. There may be certain situations in which the additional instruction time will only increase or maintain the ongoing percent of errors. As pointed out, research has already been conducted in a variety of situations which also indicate that giving "extra help" in the form of increased adult instruction (attention) may serve only to increase that behavior which immediately preceeds the instruction regardless of the good intentions of the adult. These data taken in conjunction with the findings mentioned above suggest a need for further research to determine: (1) The generality of these results, (2) the degree to which teachers commonly provide more attention consequent upon errors, and (3) the effect that this has on the errors of their pupils.

FIGURE 1

The percent of errors, and the instruction durations following correct and incorrect answers during Experiment I.

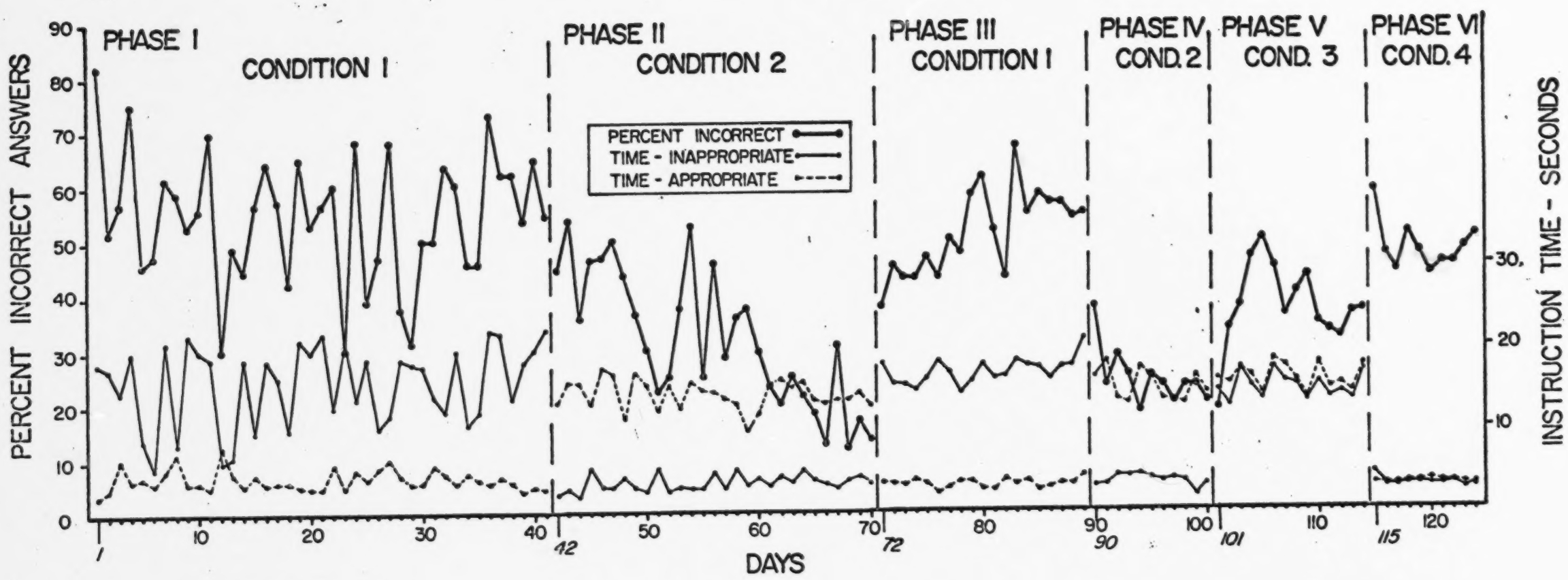
PHASE I
CONDITION I
PHASE II
CONDITION 2
PHASE III
CONDITION I
PHASE IV
COND. 2
PHASE V
COND. 3
PHASE VI
COND. 4
PERCENT INCORRECT
TIME - INAPPROPRIATE
TIME - APPROPRIATE
PERCENT INCORRECT ANSWERS
INSTRUCTION TIME - SECONDS
DAYS
0
10
20
30
40
50
60
70
80
90
100
110
120
1
42
72
90
101
115

FIGURE 1

FIGURE 2

The percent of errors, and the teacher's instruction durations following correct and incorrect answers during Experiment II.

FIGURE 3

The percent of errors, and the aide's instruction durations following correct and incorrect answers during Experiment II.

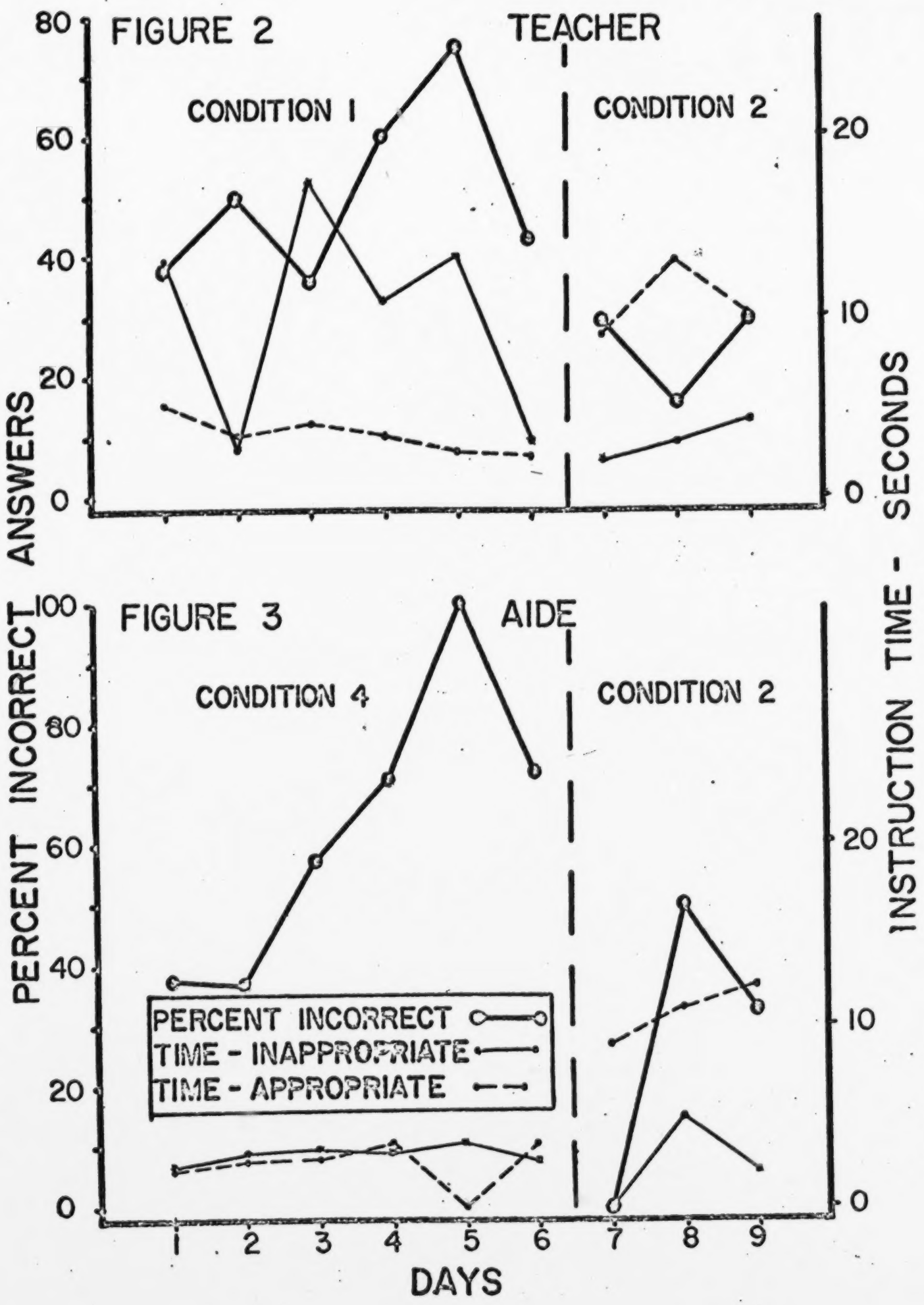
FIGURE 2
TEACHER
CONDITION 1
CONDITION 2
80
60
40
20
0
ANSWERS
20
10
0
SECONDS
FIGURE 3
AIDE
CONDITION 4
CONDITION 2
PERCENT INCORRECT
100
80
60
40
20
0
PERCENT INCORRECT
TIME - INAPPROPRIATE
TIME - APPROPRIATE
20
10
0
1
2
3
4
5
6
7
8
9
DAYS

TABLE 1

The Sequence of Experimental Phases and Teaching Conditions, and the Relative Durations of Instruction Time

Experiment I

Experimental Phase	I	II	III	IV	V	VI
Teaching Condition	1	2	1	2	3	4
Relative Duration of Instructors' Response Following Correct Answers	Short	Long	Short	Long	Long	Short
Relative Duration of Instructors' Response Following Incorrect Answers	Long	Short	Long	Short	Long	Short

Experiment II

	Teacher			Aide	
Experimental Phase	I	II		I	II
Teaching Condition	1	2		4	2
Relative Duration of Instructor's Response Following Correct Answers	Short	Long		Short	Long
Relative Duration of Instructor's Response Following Incorrect Answers	Long	Short		Short	Short

APPENDIX A

Samples of Questions (Q), Answers (A), and Consequent Instruction (I)

PHASE I

Correct Responses

Q: Did Mark like to go down to the docks on the river?

A: Yes, he did.

I: Yes Jane, that's correct. Mark did like to go down to the docks.

Q: What did Mark like about the docks?

A: He liked the sailors and monkeys and stuff.

I: Good Jane. Mark enjoyed the different things on the docks.

Incorrect Responses

Q: Why was the sailor taking the tarantula to the man?

A: He wanted to.

I: No Jane, that's not quite correct. The sailor was taking the tarantula to the man because this man was going to do something with tarantulas. So he needed all the tarantulas that he could get.

Q: What was the man doing with the tarantulas?

A: Taking them to people.

I: No Jane. The man was going to use the tarantulas like the one the sailor had to try and find a cure for the bite of the tarantula so people wouldn't become ill from the tarantula bites.

Samples of Questions (Q), Answers (A), and
Consequent Instruction (I)

PHASE II

Correct Responses

Q: Where did Hubert live?

A: Hubert lived in a log cabin on Thunderhead Mountain.

I: Yes Jane, that's correct. I'm glad that you remembered that Hubert lived on a mountain because that will be important later in the story.

Q: Did Hubert go to school?

A: No, because his folks didn't have much money.

I: Very good Jane. It's good that you knew Hubert didn't go to school and that you knew why he didn't go to school. I'm glad that you are able to remember these details.

Incorrect Responses

Q: What did Mr. Honeycutt pay Hubert for picking apples?

A: Money.

I: No Jane, that isn't the right answer.

Q: What did Hubert get from Mr. Honeycutt?

A: Clothes from the store.

I: No Jane, Hubert was given a goat for his pay.

PHASE III

Correct Responses

Q: What did Mary Reid's father do?

A: He was a sea captain and he had a boat.

I: Good Jane. Mary Reid's father was a sea captain and he

Samples of Questions (Q), Answers (A), and
Consequent Instruction (I)

did have a boat. This will be important later on in the story.

Q: What did Mary do during the day?

A: She would watch things going on.

I: Yes Jane, that's right. She would watch all the activity going on at the docks like the ships coming and going and all the sailors working on the ships. Very good.

Incorrect Responses

Q: What kind of a pet did Mary have?

A: A cat

I: No Jane, I'm afraid that isn't the right answer.

Q: What animal did Mary have as a pet?

A: Kittens.

I: No Jane, you're getting confused. Mary had a monkey for a pet.

APPENDIX B

Sample Raw Data Sheet

Correct	Incorrect	% Error	11/19/69 J.J.V.
4			
4		60.0	
	20		
	17		
4			
5		30/18.00	
4			
	18		
	18		
4			
3			
4			
3			
3			
	18		
	15		
	23		
	25		
	20		
	21		
3			
	22		
	18		
	16		
	26		
	27		
	17		
	21		
3.75	19.89		
12/45	18/358		

Sample Raw Data Sheet Continued

Correct	Incorrect	% Error	
	4	45.5	11/21/69 D.B.M.
4			
5			
5			
2			
	15		
	4		
	19		
	10		
3		33/15	
	6		
	11		
4			
8			
3			
4			
5			
4			
8			
	10		
	16		
2			
	21		
	19		
4			
	21		
4			
	5		
2			
	15		
	7		
2			
5			
4.11	12.2		
18/74	15/83		

Sample Raw Data Sheet Continued

Correct	Incorrect	% Error
4		72.7
3		
4		
	23	
	20	11/8.
	23	
	27	
	26	
	24	
	18	
	18	
3.67	22.38	
3/11	8/79	

11/24/69
J.J.V.

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